Statement of Basis

OVERVIEW OF FORT JACKSON

Fort Jackson is located in Richland County in central South Carolina. The installation is situated on the eastern edge of the city of Columbia, and covers an area of approximately 52,301 acres of contiguous property. The population for Columbia, including FTJA is estimated at 286,000. The primary mission at Fort Jackson is to provide initial entry training for the U.S. Army.

In July 1998, the facility obtained an operating permit for their hazardous waste container storage facility in accordance with R.61-79.264.

The sites requiring corrective action activities under the draft permit are identified as Solid Waste Management Units and Areas of Concern. This permit also contains conditions for the identification of Solid Waste Management Units at the facility and the implementation of corrective action for those units, if necessary.

The Statement of Basis (SOB) is being prepared in accordance with the requirements of R61-79.124.8 of the South Carolina Hazardous Waste Management Regulations (SCHWMR). The SOB explains the proposed remedies for the following Solid Waste Management Units (SWMUs) at Fort Jackson (FTJA).

SUMMARY OF CHANGES

Since the last permit corrective measures have been selected for two (2) Solid Waste Management Units (SWMUs), two (2) Areas of Concern (AOCs). An addition of two (2) Areas of Concern (AOCs) has also been added.

Remedy Selected

Site	Remedy
AOC D - Camp Jackson Ranges	Land Use Controls (LUCs)
AOC E - Small Arms Ranges East of Chestnut Road	Land Use Controls (LUCs)
SWMU 44 – WETSITE Wash Pad	No Further Action (NFA)
SWMU 49 - Former Weapons Pool Solvent Tank	- Excavation of impacted soils - Addition of calcium peroxide to excavation - Groundwater monitoring - Land Use Controls (LUCs)

Additional AOCs Added

AOC S – VA Cemetary Dudded Area
AOC T – Building 1699

Statement of Basis
Camp Jackson Ranges
Area of Concern D
Fort Jackson, South Carolina

Fort Jackson is located in Richland County in central South Carolina. The installation is situated on the eastern edge of the city of Columbia, and covers approximately 52,301 acres of contiguous property. The population for Columbia, including Fort Jackson is estimated at 286,000. The primary mission at Fort Jackson is to provide initial entry training for U.S. Army personnel.

This Statement of Basis (SOB) is intended to inform the general public of the selection of Land Use Controls (LUCs) as the remedy for Area of Concern (AOC) D at Fort Jackson, as acknowledged in the May 14, 2009, South Carolina Department of Health and Environmental Control (SCDHEC) letter (Pickett to Estaba). SCDHEC will make a final determination on the remedy of this site after the public comment period has ended and all information submitted has been reviewed and considered.

The SOB should not be considered the primary source of information for this site. The SOB summarizes information that can be found in greater detail in the following documents:

- Malcolm Pirnie, Inc. 2005. *Historical Records Review, Fort Jackson.*
- Malcolm Pirnie, Inc. 2006. *Site Inspection Report (Confirmatory Sampling Report), Fort Jackson.*

SCDHEC encourages the public to review these documents to gain a more thorough understanding of the Camp Jackson Ranges (AOC D).

Proposed Remedies

Results of site specific sampling documented in the Site Inspection Report indicate the single constituent of potential concern (COPC), lead, does not pose a significant risk to human health or the environment. Due to the low-risk nature of environmental impacts as indicated by historical sampling and assessment results performed at AOC D, Tier 1 Partnering Team members concurred that this site does not require an extensive evaluation of remedial alternatives. Based on the low-risk nature of environmental impacts and subsequent minimal exposure concerns, LUCs are warranted. The LUCs include the following:

- Adhering to the administrative Record of Environmental Consideration (REC) process documenting the project site has no significant impact on the environment and does not require more detailed analysis or documentation.
- Addition of a note in the installation master plan indicating that the areas where the ranges were located were used for small arms training in the past.
- Distributing informational devises indicating that the site was used for small arms training in the past. The literature will also discuss what to do if any small arms are found.

The Selected Remedy was recommended by Fort Jackson and agreed upon by SCDHEC.

Site Background

AOC D is located in the Cantonment Area, and encompasses approximately 62 acres. It consists of five ranges that were used during World War I for small arms training. Since then, the area has been redeveloped and used for timber harvesting. No range features are currently discernable, but general locations can be determined from historical information. A site map is included as Figure 1. The five ranges are described below.

1,000-Yard Range was the northernmost of the Camp Jackson Ranges and was a former rifle range used from 1918 to 1920. It had six long range targets with a direction of fire from west to east, stretching across Chesnut Road to approximately 1/3 mile west of Hartsville Guards Road. Approximately one third of the former range is currently located under base housing and streets adjacent to a school, but the majority of the land is undeveloped.

The 600-Yard Range was located directly to the south of the 1,000-Yard Range and had a series of 200 short range targets and 34 mid range targets with direction of fire identical to the 1000-Yard Range (west to east). This range was also used between 1918 and 1920. Although the former range is located adjacent to base housing, streets, and a school, the area is undeveloped.

The Machine Gun Range was located in the middle of the Camp Jackson Ranges, directly to the south of the 600-Yard Range. As with the other ranges, the direction of fire was towards the east, but the targets were moveable. The range was 1,000 yards long and was also operated between 1918 and 1920. The area where the Machine Gun Range was located and the immediate area surrounding it are undeveloped.

The Pistol Range was located slightly northwest of the Machine Gun Range. This range differs from the others in that the direction of fire was likely to the northeast, across the northernmost portion of the Machine Gun Range. It was constructed and used between 1919 and 1920. The location of the former range is now a recreational area that includes several ball fields.

The 300-Yard Range was located just south of the Machine Gun Range and was used from 1918 to at least 1926. It was used for rifle training and included three ranges spaced at 100, 200, and 300 yards. The Live Hand Grenade Court 2 (33 acres) was constructed in the middle of the 300-Yard Range during the 1940s, but the remaining area of the range remains undeveloped.

Site Risk

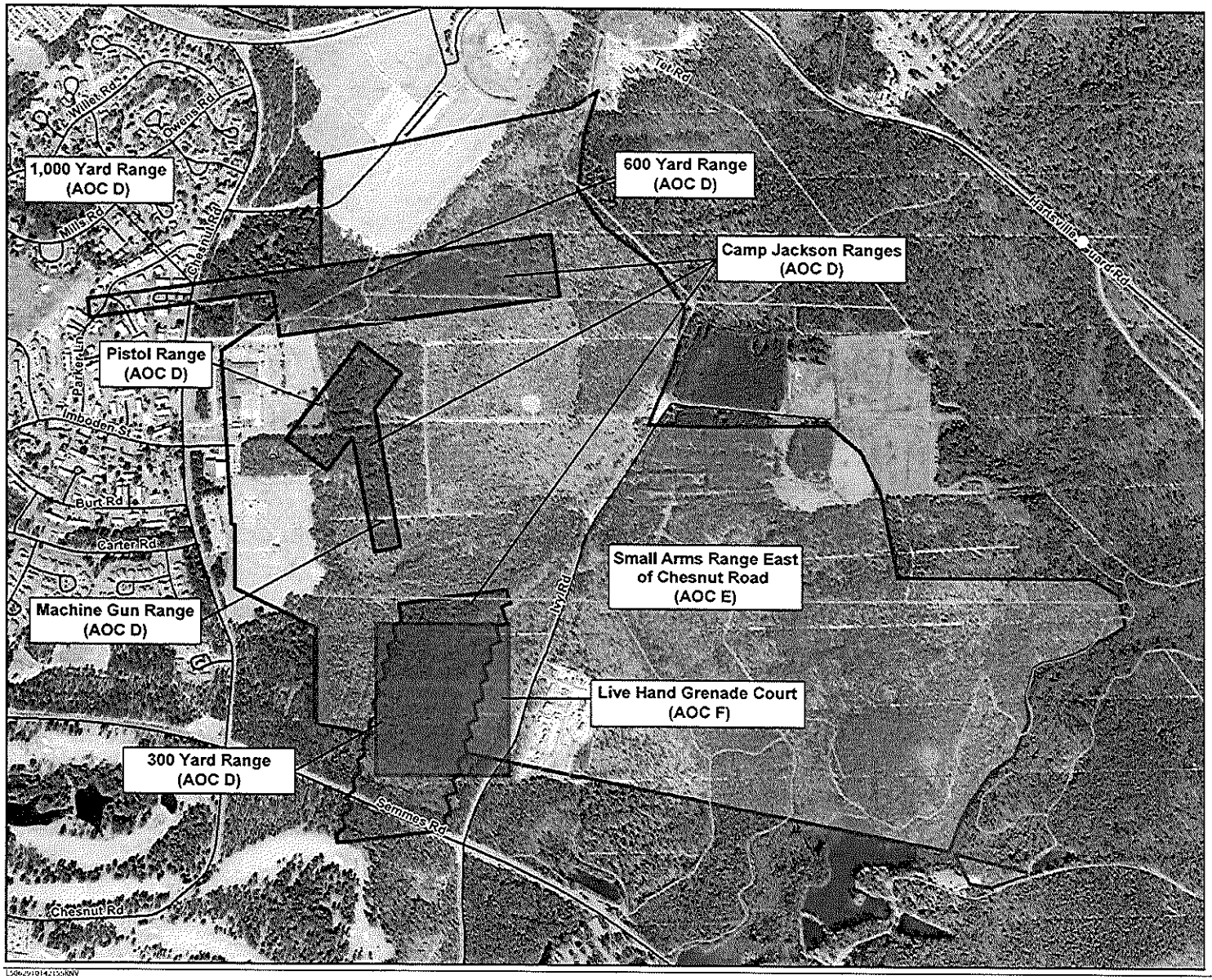
None of 47 surface soil samples collected during the Site Inspection (SI) contained lead at concentrations exceeding the Preliminary Remediation Goal (PRG) for lead. Ten of the 47 samples exceeded the Environmental Screening Value (ESV) for lead, but previous studies at FORT JACKSON concluded that lead at the levels detected (above the ESV of 50 milligrams per kilogram [mg/kg] but below the PRG of 400 mg/kg) does not pose a risk to human health or ecological receptors. Based on the results of the SI, lead concentrations in surficial soil (0 to 2 feet below ground surface) in the Camp Jackson Ranges (FORT JACKSON-001/AOC D) are unlikely to present a significant exposure risk to human health under commercial/industrial or residential land use. No Further Investigation (NFI) with LUCs was recommended, and SCDHEC concurred.

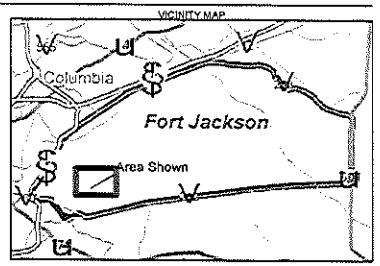
Scope of Corrective Action

The data collected from the soils were evaluated to determine the nature and extent of any potential impacts from historical activities at AOC D. The analytical data collected during the AOC SI investigation, were evaluated against the U.S. Environmental Protection Agency (EPA) criteria, as well as background data gathered from the 2001 Fort Jackson Soil Background Study, to identify any potential risks to human health from exposure to any detected constituents. In each case, it was determined that there was no notable risk under current site use. Therefore, the NFI with LUCs recommendation by Fort Jackson for this site was approved by SCDHEC.

Declaration

Per the approved *Site Inspection Report (Confirmatory Sampling Report) for Fort Jackson*, this site should pose no further risk to human health and the environment under its current use. NFI with LUCs will be final for AOC D under current use, upon the modification of the Fort Jackson RCRA Corrective Action Permit.





LEGEND

Primary Road

Secondary Road

Camp Jackson Ranges

Small Arms Ranges East of Chesnut Road

Live Hand Grenade Ct 2

Notes:

1. Imagery Source: Fort Jackson Environmental Division (DPW-ENV), 2008

0 200 400 800

Feet

1 inch = 800 feet

FIGURE 1
Site Map
AOC D
Statement of Basis
Fort Jackson, South Carolina

CH2MHILL

Statement of Basis
Small Arms Ranges East of Chesnut Road
Area of Concern E
Fort Jackson, South Carolina

Fort Jackson is located in Richland County in central South Carolina. The installation is situated on the eastern edge of the city of Columbia, and covers approximately 52,301 acres of contiguous property. The population for Columbia, including Fort Jackson is estimated at 286,000. The primary mission at Fort Jackson is to provide initial entry training for U.S. Army personnel.

This Statement of Basis (SOB) is intended to inform the general public of the selection of Land Use Controls (LUCs) as the remedy for Area of Concern (AOC) E at Fort Jackson, as acknowledged in the May 14, 2009, South Carolina Department of Health and Environmental Control (SCDHEC) letter (Pickett to Estaba). SCDHEC will make a final determination on the remedy of this site after the public comment period has ended and all information submitted has been reviewed and considered.

The SOB should not be considered the primary source of information for this site. The SOB summarizes information that can be found in greater detail in the following documents:

- Malcolm Pirnie, Inc. 2005. *Historical Records Review, Fort Jackson.*
- Malcolm Pirnie, Inc. 2006. *Site Inspection Report (Confirmatory Sampling Report), Fort Jackson.*

SCDHEC encourages the public to review these documents to gain a more thorough understanding of the Small Arms Ranges East of Chesnut Road (AOC E).

Proposed Remedies

Results of site specific sampling documented in the Site Inspection Report indicate the single constituent of potential concern (COPC), lead, does not pose a significant risk to human health or the environment. Due to the low-risk nature of environmental impacts as indicated by historical sampling and assessment results performed at AOC E, Tier 1 Partnering Team members concurred that this site does not require an extensive evaluation of remedial alternatives. Based on the low-risk nature of environmental impacts and subsequent minimal exposure concerns, LUCs are warranted. The LUCs include the following:

- Adhering to the administrative Record of Environmental Consideration (REC) process documenting the project site has no significant impact on the environment and does not require more detailed analysis or documentation.
- Addition of a note in the installation master plan indicating that the areas where the ranges were located were used for small arms training in the past.
- Distributing literature to any relevant parties that the site was formerly used for small arms training in the past. The literature will also discuss what to do if any small arms are found.

The Selected Remedy was recommended by Fort Jackson and agreed upon by SCDHEC.

Site Background

AOC E encompasses approximately 475 acres of the Cantonment Area. It includes four separate ranges that were used between the 1940s and 1970s. The firing lines and target areas for the ranges for approximately 80 acres of the 475 acres. The area has been redeveloped for use as a school and

recreational area, as well as timber harvesting. No range features are still discernable, but historical information provides general locations for firing lines and target areas. A site map is included as Figure 1.

The Transition Range was located east of Chesnut Road, north of Semmes Road, and south of Red Diamond and Hartsville Guards Roads. It was used from 1947 to 1956 and had a firing direction of west to east.

The 1000-Inch Range was located south of Hampton Parkway with most of the range, except a small area near the southern portion of the firing line, being overlapped by the Transition Range. The firing point and target area was located south of Hampton Parkway, with the firing direction to the southeast.

The Pistol Range NR 2 was located east of Chesnut Road within the area identified previously as the Transition Range. Historical photographs indicate five berms running from east to west divided the range into four firing lines. The firing points were located on the west side of the range with a target area located on the east side.

The Landscape Target Range was also located to the south of Hampton Parkway. The firing line was located southeast of the Cantonment Area, with the firing direction to the northwest. The Landscape Target Ranges is overlapped in places by the Transition Ranges and the 1000-Inch Range.

Site Risk

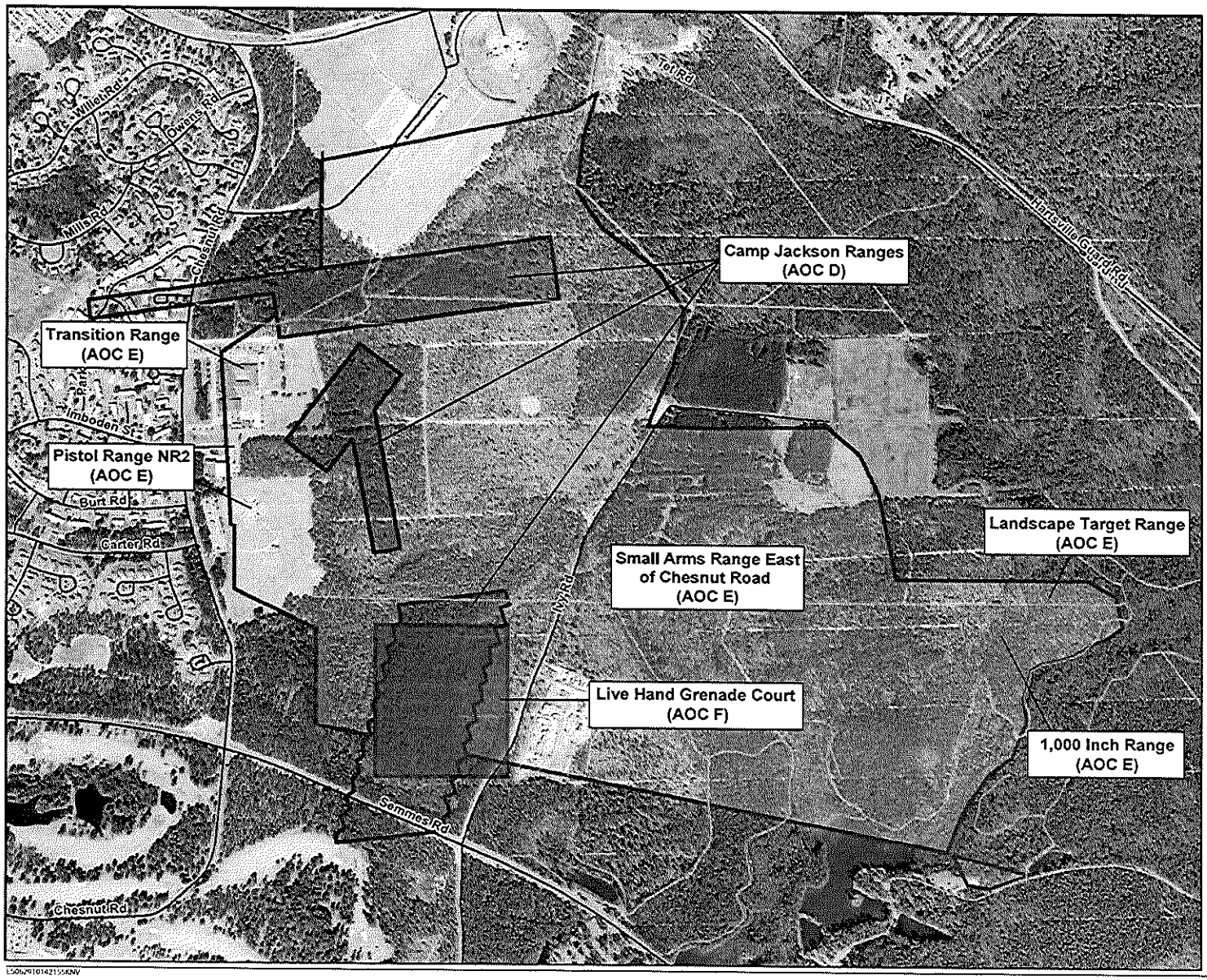
None of 51 surface soil samples collected during the Site Inspection (SI) contained lead at concentrations exceeding the Preliminary Remediation Goal (PRG) for lead. Twelve of the 51 samples exceeded the Environmental Screening Value (ESV) for lead, but previous studies at Fort Jackson concluded that lead at the levels detected (above the ESV of 50 milligrams per kilogram [mg/kg] but below the PRG of 400 mg/kg) does not pose a risk to human health or ecological receptors. Based on the results of the SI, lead concentrations in surficial soil (0 to 2 feet below ground surface) in the Small Arms Ranges East of Chesnut Road area (Fort Jackson-002/AOC E) of the Fort Jackson site are unlikely to present a significant risk to human health under commercial/industrial or residential land use. No Further Investigation (NFI) with LUCs was recommended, and SCDHEC concurred.

Scope of Corrective Action

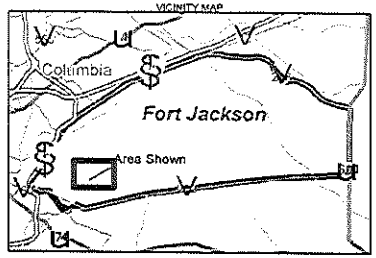
The data collected from the soils were evaluated to determine the nature and extent of any potential impacts from historical activities at AOC E. The analytical data collected during the AOC SI investigation, were evaluated against the U.S. Environmental Protection Agency (EPA) criteria, as well as background data gathered from the 2001 Fort Jackson Soil Background Study, to identify any potential risks to human health from exposure to any detected constituents. In each case, it was determined that there was no notable risk under current site use. Therefore, the NFI with LUCs recommendation by Fort Jackson for this site was approved by SCDHEC.

Declaration

Per the approved *Site Inspection Report (Confirmatory Sampling Report) for Fort Jackson*, this site should pose no further risk to human health and the environment under its current use. NFI with LUCs will be final for AOC E under current use, upon the modification of the Fort Jackson RCRA Corrective Action Permit.



VICINITY MAP



LEGEND

- Primary Road
- Secondary Road
- Camp Jackson Ranges
- Small Arms Ranges East of Chesnut Road
- Live Hand Grenade Ct 2

Notes:

1. Imagery Source: Fort Jackson Environmental Division (DPW-ENV), 2008

0 200 400 800
Feet

1 inch = 800 feet

FIGURE 1
Site Map
AOC E
Statement of Basis
Fort Jackson, South Carolina

CH2MHILL

STATEMENT OF BASIS
NATIONAL GUARD SEPTIC TANK/TILE FIELD (SWMU 44)
FORT JACKSON

Fort Jackson Fort Jackson is located in Richland County in central South Carolina. The installation is situated on the eastern edge of the city of Columbia, and covers an area of approximately 52,301 acres of contiguous property. The population for Columbia, including Fort Jackson is estimated at 286,000. The primary mission at Fort Jackson is to provide initial entry training for the U.S. Army.

This Statement of Basis (SoB) is intended to inform the general public of the no further action (NFA) decision for Solid Waste Management Unit (SWMU) 44 at Fort Jackson, as stated in the November 2, 2009, South Carolina Department of Health and Environmental Control (DHEC) letter (Pickett to Estaba). DHEC will make a final determination on the closure of this site after the public comment period has ended and all information submitted has been reviewed and considered.

The SoB should not be considered the primary source of information for this site. The SoB summarizes information that can be found in greater detail in the following documents:

- *RCRA Facility Investigation Workplan for UTES Septic Tank System, SWMU 44,* Kleen Sites Geoservices, Inc., 1994
- *DRAFT Phase II RCRA Facility Investigation Report, SWMU 44,* Kleen Sites Geoservices, Inc., December 30, 2002
- *Revised Proposed Supplemental RFI Activity Workplan (Version 2), SWMU 44,* Kleen Sites Geoservices, Inc., April 27, 2006
- *Phase II RCRA Facility Investigation Report (Revision 01), SWMU 44,* Kleen Sites Geoservices, Inc., September 22, 2009

DHEC encourages the public to review these documents in order to gain a more thorough understanding of SWMU 44.

PROPOSED REMEDIES

Based on the investigations of the soil and ground water work performed for SWMU 44, NFA has been approved and issued.

SITE BACKGROUND

SWMU 44 is a former septic and drain tile field. The septic tank was the outfall from the former battery neutralization room at the Unit Equipment Training Site (UTES) at McCrady Training Center (MTC) located in Eastover, SC. Outflow water mixed with battery chemicals would flow into the septic tank and drain into the septic tank and tile field to disperse into the surrounding soil and groundwater. Due to the fact that no proper water treatment was applied prior to discharge into the environment, this constituted an illegal discharge without a permit

from the state. The SCARNG ceased this practice and reverted to a program where all automotive batteries were exchanged one for one with Exide Battery Co. Therefore the battery neutralization program ended and the battery room was converted into a locker room and storage area. The remaining septic tank and tile field became SCARNG's SWMU #44.

SITE RISK

Once SWMU 44 was established, the SCARNG embarked on an aggressive cleanup and rehabilitation program to address the environmental impacts leftover from operating the former battery room. The septic tank and tile field were removed and disposed of in May of 2002. One monitoring well was placed in the area of the former septic tank. After several years of monitoring the site, test results met all state clean water and soils parameters. At the conclusion of the RFI, a NFA decision was requested by Fort Jackson /SCARNG. DHEC concurred, as stated in the 2 November 2009, DHEC letter.

SCOPE OF CORRECTIVE ACTION

No Further Action

DECLARATION

Per the approved *Phase II RCRA Facility Investigation Report* and NFA concurrence from DHEC, this site should pose no further risk to human health and the environment under its current use. Formal NFA status of this site will be final under current site use, upon the modification of the Fort Jackson RCRA Corrective Action Permit.

Statement of Basis
Solid Waste Management Unit (SWMU) 49
Fort Jackson, South Carolina

Fort Jackson is located in Columbia, Richland County, South Carolina. The installation is located on the eastern side of the City of Columbia, and covers approximately 52,301 acres of contiguous property. The population of Columbia, including Fort Jackson is estimated at 286,000. The primary mission at Fort Jackson is to provide initial entry level training for the United States Army.

This Statement of Basis (SOB) is intended to inform the general public of the Proposed Remedy, which was conditionally approved in the January 6, 2011, South Carolina Department of Health and Environmental Control (SCDHEC) conditional approval letter. Upon completion of the public comment period SCDHEC will make a final determination of the Selected Remedy.

This SOB should not be considered the primary source of information for this site. The SOB summarizes information that can be found in greater detail in the following documents:

- Final Interim Measures and Phase 2 RFI Report for SWMU 49, Former Weapons Pool Solvent Tank (USACE, March 2003),
- Draft Supplemental RFI Report for SWMU 49, Former Weapons Pool Solvent Tank (USACE, 2008),
- Corrective Measures Study Work Plan, SWMU 49, Former Weapons Pool Solvent Tank (ARCADIS, May 2009),
- Corrective Measures Study Report, Revision 2 (ARCADIS, December 2010).

SCDHEC encourages the public to review these documents in order to gain a more thorough understanding of existing environmental conditions at SWMU 49.

PROPOSED REMEDY

Historical media sampling events evaluated surface soil, subsurface soil, and groundwater. Evaluations of laboratory data of identified constituents revealed unacceptable risks associated with groundwater and soil at SWMU 49. Impacts in the subsurface soil remain above the remedial levels for the site. Groundwater impacts are due to the direct release of constituents from the surrounding soil into the water table.

Consequently, the Selected Remedy is identified as

- excavation of impacted soils
- addition of calcium peroxide to excavation
- groundwater monitoring
- and institutional controls

Excavation of accessible impacted soils satisfies the Corrective Measure Objectives of minimizing infiltration through subsurface soils exceeding screening criteria. Soil Screening Levels. Excavation would minimally disturb the activities of the surrounding Fort Jackson facilities and is an effective remedial method. Groundwater monitoring and application of calcium peroxide to the bottom of the excavation would help assist in the monitored natural attenuation. Monitored natural attenuation is appropriate where its use would be protective of human health and the environment and where it is capable of achieving site-specific remediation objectives within a timeframe that is reasonable compared to other alternatives. Further, infrastructure for monitored natural attenuation, such as monitoring wells, has already been established for SWMU 49. There is also generation of lesser volume of remediation

wastes, less intrusive technology is required, and there are potentially lower overall remediation costs than those associated with more intrusive remediation techniques. Finally, land use controls will be established to restrict land and groundwater use until site soil and/or groundwater concentrations are at levels that allow unrestricted use and unlimited exposure. This ensures management of any subsurface activities in areas where soils and/or groundwater exceed cleanup criteria after remediation. They also serve to notify current and future users about the environmental conditions of the property. Land use controls evaluated include site use restrictions and physical barrier signage. The Proposed Remedy was recommended by Fort Jackson and agreed upon by SCDHEC.

SITE BACKGROUND

SWMU 49 was an in-ground 4-foot by 4-foot by 5-foot concrete vault, located at the southwest corner of Building 3058. The vault was a sand and oil trap covered by an unsecured steel plate. A 4-inch diameter pipe connected the vault to a sump or grille type floor drain inside the building. Another 6 inch diameter pipe connected the concrete vault to the storm sewer. Building 3058 served as the Weapons Pool from 1972 until 1993. The building was used to store, clean and repair small arms used on post. Until the mid 1980s, spent solvents from the weapons cleaning operations were poured into the concrete vault or discharged through the sump and accumulated in the concrete vault. An unidentified contractor emptied the concrete vault as needed and disposed of its contents. The type and chemical composition of the solvent used in the weapons cleaning process is unknown. During the mid 1980s, self-contained Safety Kleen solvent baths replaced the earlier cleaning procedures. Sometime after this change in procedures, the sump was completely plugged. The procedure used to plug the sump is unknown. In 2002, the former concrete vault and accessible piping was removed.

RCRA Facility Investigations (Phase I and II) were initiated in 2001 and completed in 2003. Investigations concluded that there were detectable levels of naphthalene and RCRA metals (primarily arsenic) in groundwater and soils at concentrations exceeding the applicable screening criteria. An investigation following the 2009 Corrective Measures Study Work Plan concluded groundwater samples from the deep borings and permanent monitoring wells showed exceedances of the screening criteria for benzene, naphthalene, 1,1,2,2-tetrachloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, arsenic, barium, iron, and lead. Soil sample results showed exceedances around 4 to 10 feet below ground surface for barium, lead, silver, selenium, 1,2,4-trimethylbenzene, methyl-n-butyl ketone, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene. The Selected Remedy for the SWMU 49 includes groundwater monitoring, excavation of impacted soils, and land use controls.

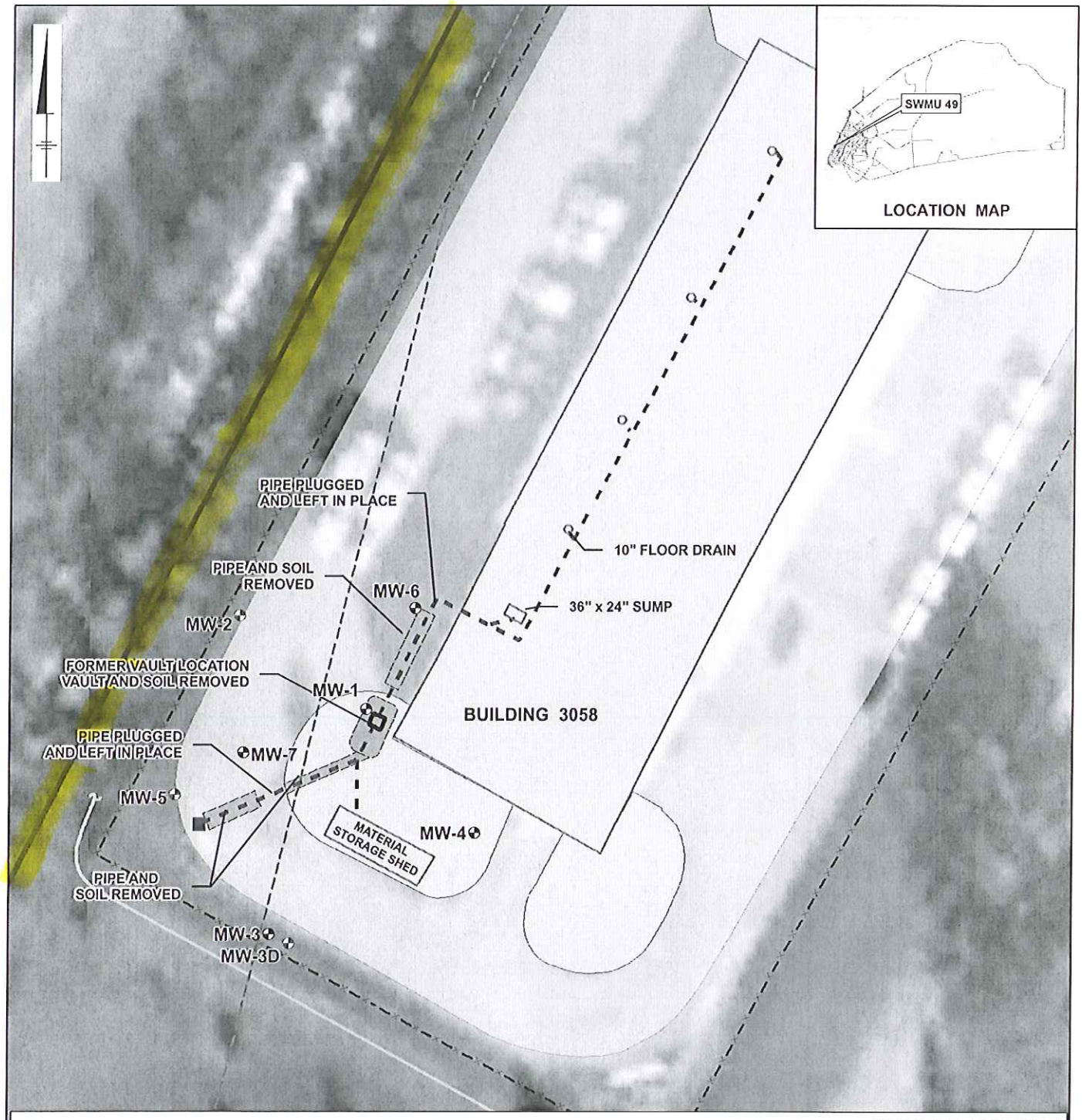
SCOPE OF CORRECTIVE ACTION

Results of site-specific sampling events indicate that there is a potential risk associated with previously identified compounds in groundwater. Media cleanup objectives were evaluated by SCDHEC and Fort Jackson to develop appropriate regulatory objectives for SWMU 49. Media cleanup objectives at SWMU 49 will focus primarily on removal of impacted subsurface soils and monitoring groundwater, to ensure constituent concentrations continue to naturally degrade. Media cleanup objectives will be supported by excavation of accessible impacted soils and groundwater monitoring in order to confirm that the current groundwater quality is maintained. Groundwater monitoring will be initiated following the excavation on a quarterly basis for one year followed by semi-annual monitoring to confirm the current groundwater quality is maintained. In addition to the current groundwater monitoring well network two additional shallow groundwater wells will be installed and added to the monitoring network. Land use controls will also be set up to include areas where subsurface soil is not accessible due to existing structures. Land use controls will include a restriction of subsurface activities beneath Building 3058, including associated pipes and floor drains. In the event that Building 3058 is demolished, the site

restrictions will include a requirement for additional investigation of the subsurface soil including pipes and floor drains beneath the Building.

DECLARATION

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate to this remedial action, and is cost effective. This remedy satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility or volume as a principal element and utilizes permanent solutions and alternative technologies to the maximum extent possible. Formal status of this site will be final, upon the modification of the Fort Jackson RCRA Corrective Action Permit.



LEGEND

- Building
- Pavement/Parking
- Previous Excavation Area
- Fort Jackson Property Boundary

Monitoring Well

- Deep
- Shallow

- Fence
- Former Vault
- SWMU 49 Sewer Pipe
- Drainage Pipe
- Sump/Floor DraIN
- Stormwater Inlet
- Approx. Location of Fiber Optic Line

IMAGE SOURCE: GOOGLE EARTH PRO OCTOBER, 2010 (DIGITAL GLOBE)

0 40 80

SCALE IN FEET

U.S.ARMY

ARCADIS

Client: U.S. Army Garrison, Fort Jackson
Project: GP08FJ49.S049.CP0WP
Project Manager: Pat Shirley
Cartography By: S. Sutton
Date: 25OCT2010

SWMU 49
Site Location Map

FORT JACKSON, SOUTH CAROLINA

FIGURE
1-1